



0013

## PHYSICAL TESTING ANALYSIS REPORT

**Description:** Determination of Frost Resistance

**Test Method:** EN 539-2:2013

**Lucideon Reference:** (165184)-35461

**Client:** Dreadnought Tiles  
Dreadnought Works  
Dreadnought Road  
Pensnett  
Brierley Hill  
West Midlands  
DY5 4TH

**For the Attention of:** Mr. Christopher Dyke

**Date Logged:** 18-Nov-2016

**Date of Tests:** 03-Jan-2017 to 02-Mar-2017

**Report Date:** 03-Mar-2017

**Purchase Order No.:** 28831

Please find attached the results for the sample(s) recently submitted for analysis.

Opinions and interpretations expressed herein are outside the scope of UKAS Accreditation.

**Miss Zoe Kinally**  
**Manager**



**CLAY ROOFING TILES –  
 TEST FOR FROST RESISTANCE FOR DISCONTINUOUS LAYING  
 DETERMINATION OF PHYSICAL CHARACTERISTICS  
 BS EN 539 Part 2 Test for Frost Resistance 2013**

**1 SAMPLES RECEIVED**

6 x plain tiles with nominal dimensions of 265 x 165 mm, as sampled by client.

**2 TEST PROCEDURE**

**2.1 Saturation of Tiles**

The samples were dried at 110°C, weighed and examined for existing defects, then progressively immersed in water over a period of 5 days. After the tiles are fully immersed they are then left to soak for a further 72 hours, then they are removed and weighed. The water absorption results are given in Table 2.

**2.2 Freeze/Thaw Tests**

The tiles were tested according to the method described in BS EN 539-2: 2013 European Single Test Method using the apparatus illustrated in that standard, with the exception that the tiles were examined at 30, 90, 150, 180, 270, 360 and 400 cycles.

**2.3 Results**

The tiles are assessed for damage using the criteria stated in Table 1.

**Table 1 - Interpretation of the Result**

		Front	Back
<b>1</b>	Pit	-	-
<b>2</b>	Hair Crack	-	-
<b>3</b>	Nascent Crack	-	-
<b>4</b>	Surface Crack	X	X <sup>a</sup>
<b>5</b>	Surface Damage (chip, peeling, flaking)	X	X <sup>a</sup>
<b>6</b>	Structural	X	X
<b>7</b>	Loss of Interlocking ribs	X	X
<b>8</b>	Break	X	X
<b>9</b>	Delamination	X	X
<b>10</b>	Loss of all Nibs	X	X

**X** = unacceptable / **-** = acceptable

Note: the degree of damaging can be demonstrated through a change in the impermeability and/or flexural strength of the product

<sup>a</sup> Where the degree of damage indicates that the functional performance of the product would not be assured.

**Lucideon Reference:** (165184)-35461  
**Customer Reference:** TP1SB/01  
**Description:** Staffordshire Blue Smooth Tile



**Table 2**

Tile No	% Water Absorption	Frost Damage													
		30 Cycles (Front)	30 Cycles (Back)	90 Cycles (Front)	90 Cycles (Back)	150 Cycles (Front)	150 Cycles (Back)	180 Cycles (Front)	180 Cycles (Back)	270 Cycles (Front)	270 Cycles (Back)	360 Cycles (Front)	360 Cycles (Back)	400 Cycles (Front)	400 Cycles (Back)
1	3.9	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage
2	3.1	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage
3	3.2	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage
4	3.4	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage
5	3.5	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage
6	3.6	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage
<b>Mean</b>	3.5	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage	No Damage

The tiles were examined after 150 cycles for signs of damage due to the action of frost.

### 3 SUMMARY AND CONCLUSIONS

The samples meet the criteria for level 1, minimum 150 cycles in the above standard.

**END OF TEST REPORT**